

WATER QUALITY APPLICATION INSTRUCTIONS

Determine eligibility for this general permit:

- Review the eligibility criteria below
 - If the project does not meet all of the eligibility standards, apply for an Individual Permit
 - All projects must meet the eligibility standards in Table 1. Refer to the eligibility standard in Tables 2-6 for activity-specific eligibility standards, as applicable.

Table 1	General Eligibility Standards
Table 2	Wetland Standards
Table 3	Water Structure Control Standards
Table 4	Dredging Standards
Table 5	Grading Standards
Table 6	Ford Standards

To apply:

- Apply online using our online ePermitting System at <http://dnr.wi.gov/permits/water>
- Include all required attachments. Each document must be less than 15 megabytes and our online system offers a help guide to reduce file sizes,
- Permit processing review times begin when all of the required application materials are received by the DNR. The department may require additional information to evaluate the project.
- If you have questions regarding your application, contact the local Water Management Specialist for your county <http://dnr.wi.gov/topic/Waterways/contacts.html#county>.

Please note, prior to starting any work at the project site, you are responsible for obtaining:

- All necessary local (e.g. city, town, village or county) permits.
- U.S. Army Corps of Engineer permits or approvals, <http://www.mvp.usace.army.mil/Missions/Regulatory.aspx>.
- Any other applicable state permits

Required attachments – Forms or documents you upload in our online ePermitting System:

1. **Application form** – A complete, signed application form “Water Resources Application for Project Permits (WRAPP)” (Form 3500-053).
2. **Application fee** – Payment must be submitted through the ePermitting System as part of the application process. A list of fees can be found at <http://dnr.wi.gov/topic/waterways/documents/PermitDocs/feesheet.pdf>.
3. **Ownership documentation** – (i.e. copy of deed, land contract, current property tax statement/receipt)
4. **Site maps** which clearly illustrate the location and perimeter of the project site, and its relationship to nearby water resources (e.g. lakes, rivers, streams, wetlands), major landmarks and roads. Provide copies of relevant maps (e.g. wetland, aerial, topographical, soil, floodplain, or zoning maps), with the project location clearly identified. The department offers a web mapping tool to assist in creating these maps at <http://dnr.wi.gov/topic/surfacewater/swdvw/>.
5. **Photographs** that clearly show the existing project area. Remember that too much snow cover or

vegetation may obscure important details. If possible, have another person stand near the project area for size reference. Photos must also document the existing water quality concern that the project is seeking to address.

6. **Plans and specifications** that show what you intend to do. Plan drawings should be clear and to scale. Be sure to draw all plans as accurately and detailed as possible. The department reserves the right to require additional information to evaluate the project.
7. **Water quality conservation drawing/plans and narrative** reflecting the General Permit Eligibility Standards as listed in the project-specific checklist below. Information to include:
 - Goal and objective for project
 - How the project will be carried out - including long-term site management
 - The number and location of the project elements relative to the property boundary, the Ordinary High Water Mark (OHWM) and/or wetland boundaries with the location and size of all proposed wetland impacts (if applicable)
 - Proposed erosion control measures (temporary & permanent)
 - Disposal location for excavated materials, if applicable
 - The location of any temporary or permanent ford crossing, if applicable
 - The location of any tile placement, if applicable
 - Top, side, and cross section plan profiles with appropriate measurements for the proposed project
 - Types of vegetation found in existing wetland and adjacent wetlands, if applicable
 - Total wetland acres that will be impacted permanently and temporarily, if applicable
 - Volume of material to be dredged, if applicable
 - Any previous sediment sampling (including field observations) and analysis data from the area to be dredged or from the proposed disposal site, if applicable
 - Anticipated starting and completion dates of the proposed project
 - Your proposed construction schedule and sequence of work
 - How you plan to avoid, minimize and mitigate impacts to waterways and wetlands
8. **If applicable, completed dam design calculations** (including any hydrologic or hydraulic calculations and project benchmark description used for design elevations - attach benchmark location information to the plan and specification submittal if a dam is proposed.

NOTE: The supplemental dam checklist at the end of this application checklist was created to help you verify and ensure you include all dam information necessary to have a complete application.

9. **Endangered and threatened resources** – The applicant is not required, but is encouraged to request an endangered resources (ER) review letter before applying for the permit. Information on how to obtain a review can be found by visiting the website at <http://dnr.wi.gov/topic/ERReview/Review.html>. The applicant can also visit the NHI Public Portal, <http://dnr.wi.gov/topic/ERReview/PublicPortal.html>, to determine if a full ER Review is required. Read the 'What is an ER Preliminary Assessment and what do the results mean?' section to determine follow-up steps.
10. **Historical and cultural resources** – If you are aware there is a historical or cultural resource present, you are **required** to contact the Wisconsin State Historical Society to verify and receive documentation that the activity will not result in an adverse impact to these resources.

Table 1. General Eligibility Criteria

<p>Eligibility Criteria: Projects that do not meet all criteria are not eligible for this general permit. If your project does not qualify for this general permit, you may apply for an individual permit.</p>	
<p>At least one of the following government agencies is providing technical assistance for the project or has entered into a binding agreement (such as a cost share agreement) with the landowner(s) to install and maintain a water quality improvement project:</p> <ul style="list-style-type: none"> - Department of Natural Resources (DNR); - Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP); - United States Department of Agriculture - Natural Resource Conservation Service (NRCS); - United States Fish & Wildlife Service (FWS); or, - County land conservation department (sometimes abbreviated to LWCD or LCD) 	
<p>The project purpose is to install water quality best management practices associated with a single and complete project.</p>	
<p>The project will not be located in an Area of Special Natural Resource Interest (ASNRI) and will not be located in a Public Rights Feature (PRF) identified pursuant to s. NR 1.06(5), Wis. Stat.</p> <p>To determine if a waterway is a ASNRI or PRF, you may use the Designated Waters Theme of DNR's Surface Water Data Viewer (SWDV): https://dnr.wi.gov/topic/surfacewater/swdv/.</p>	
<p>The application includes documentation showing current site conditions such as topography, soils, vegetation, or hydrology that have the degraded surface water quality and can be corrected through conservation activities. Documentation can include current photographic evidence.</p>	
<p>The project involves only the following list of conservation practices that are designed and will be constructed to meet the following applicable Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practices: 412 - Grassed Waterways, 393 - Filter Strip, 468 - Lined Waterway, 410 - Grade Stabilization Structure, 578 - Stream Crossing, 638 - Water and Sediment Control Basin, 402- Dam, and 350 - Sediment Basin. Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practice 587- Structure for Water Controls and 620- Underground Outlets can be used if associated with a roof runoff structure. Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practice 656 - Constructed Wetlands may be used for improving the quality of storm water runoff or other water flows lacking specific water quality discharge criteria. Only if it is necessary for the functionality of the Field Office Technical Guide Standard Conservation Practices listed above may the project involve Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practices 606 - Subsurface Drain, 500 - Obstruction Removal, and/or 572 - Spoil Spreading. NRCS Technical Standards are available at https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/.</p>	
<p>Placement and sizing of subsurface drains must be limited to only what is necessary to ensure the functionality of the Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practices 412 - Grassed Waterways and must be no larger than 12 inches in diameter.</p>	
<p>The project is not eligible for authorization under a "Superior SAMP" permit reviewed by the City of Superior, Wisconsin.</p>	
<p>The project applicant is the landowner, easement holder, or someone who otherwise has legal authorization to proceed, unless the project creates a water control structure on a non-navigable waterway in which case the project applicant must be the landowner.</p>	

<p>The project will not adversely impact any of the following wetlands: Great Lakes ridge and swale complexes, interdunal wetlands, coastal plain marshes, emergent marshes containing wild rice, southern sphagnum bogs as defined in s. 281.36(3g)(d)5m, Wis. Stats., boreal rich fens, or calcareous fens.</p>	
<p>A project is not eligible for this general permit if it has the potential to negatively impact a cold water community as defined in s. NR 102.04(3)(a), Wis. Admin. Code, or the project is proposed in an area with evidence of spring activity. To determine if a waterway is a cold water community, you may use the Designated Waters Theme of DNR's Surface Water Data Viewer: https://dnr.wi.gov/topic/surfacewater/swdv/.</p>	
<p>The project shall not result in significant adverse impacts to fishery spawning habitat, including obstruction of fish passage, or adversely affect bird breeding areas or substantially disrupts the movement of species that normally migrate from open water to upland or vice versa (i.e. amphibians, reptiles and mammals) as determined by the Department.</p>	
<p>Erosion control measures shall meet or exceed the technical standards for erosion control approved by the department under subch. V of ch. NR 151. Any area where topsoil is exposed during placement, repair or removal of a structure shall be immediately seeded and mulched to stabilize disturbed areas and prevent soils from being eroded and washed into the waterway. These standards can be found at: http://dnr.wi.gov/topic/stormwater/standards/.</p>	
<p>The project will not result in adverse impacts to adjacent properties, unless the affected landowners have authorized such impacts by recorded easement.</p>	
<p>All equipment used for the project including but not limited to tracked vehicles, barges, boats, hoses, sheet pile and pumps shall be de-contaminated for invasive and exotic viruses and species prior to use and after use.</p> <p>The following steps must be taken every time you move your equipment to avoid transporting invasive and exotic viruses and species. To the extent practicable, equipment and gear used on infested waters shall not be used on other non-infested waters.</p> <ul style="list-style-type: none"> • Inspect and remove aquatic plants, animals, and mud from your equipment. • Drain all water from your equipment that comes in contact with infested waters, including but not limited to tracked vehicles, barges, boats, hoses, sheet pile and pumps. • Dispose of aquatic plants, animals in the trash. Never release or transfer aquatic plants, animals or water from one waterbody to another. <p>Wash your equipment with hot (>104° F) or high pressure water, steam clean or allow your equipment to dry thoroughly for 5 days.</p>	
<p>Follow the most recent department approved washing and disinfection protocols and department approved best management practices to avoid the spread of invasive species as outlined in NR 40, Wis. Adm. Code. These protocols and practices can be found on the Department website at http://dnr.wi.gov/topic/Invasives/bmp.html Keyword: "equipment operator" and at http://dnr.wi.gov/topic/Invasives/documents/EquipOper.pdf</p>	
<p>The Agency(ies) and landowner must obtain any other local, state or federal permits before any work may proceed. This may include applicable U.S. Army Corps of Engineers wetland permits, local floodplain development permits, stormwater permits, and shoreland zoning permits.</p>	

The project plans minimize adverse impacts on fish movement, fish spawning, egg incubation periods and high stream flows, the project may not occur during the following time periods:

- ✓ September 15 through May 15 for trout streams and navigable tributaries to trout streams.
- ✓ March 1st through June 15th for ALL OTHER waters.

Note: Per ch. NR 1.02(7), the department identifies and classifies trout streams to ensure adequate protection and proper management of this unique resource. To determine if a waterway is a trout stream, you may use the Designated Waters Theme on DNR's Surface Water Data Viewer:

<http://dnr.wi.gov/topic/surfacewater/swdv/>

Note: The applicant may request that these time period restrictions be waived by the department on a case-by- case basis, by submitting a written statement signed by the local department fisheries biologist, documenting consultation about the proposed dredging project, and that the local department fisheries biologist has determined that the requirements of this paragraph are not necessary to protect fish spawning for the proposed project.

With the exemption of projects authorized under Table 3, repairs (not enhancements) associated with this project are allowed without additional waterway and wetland permits provided the repairs are within the scope and footprint of the original permit and do not have a significant adverse impact to fishery spawning or fishery spawning habitat. To minimize adverse impacts on fish movement, fish spawning, and egg incubation periods, material may not be removed during any of these periods:

- ✓ September 15 through May 15 for trout streams and navigable tributaries to trout streams.
- ✓ March 1st through June 15th for ALL OTHER waters.

Note: Per ch. NR 1.02(7), the department identifies and classifies trout streams to ensure adequate protection and proper management of this unique resource. To determine if a waterway is a trout stream, you may use the Designated Waters Theme on DNR's Surface Water Data Viewer:

<http://dnr.wi.gov/topic/surfacewater/swdv/>

Note: The applicant may request that these time period restrictions be waived by the department on a case-by- case basis, by submitting a written statement signed by the local department fisheries biologist, documenting consultation about the proposed dredging project, and that the local department fisheries biologist has determined that the requirements of this paragraph are not necessary to protect fish spawning for the proposed project.

The project meets all other applicable standards in Table 2-6.

Table 2. Wetland Criteria.

Wetland Eligibility Criteria:	
Projects that impact wetland and do not meet all criteria are not eligible for this general permit. If your project does not qualify for this general permit, you may apply for an individual permit.	
Natural wetland are not being converted for stormwater treatment or to meet the NRCS technical standards for constructed wetlands (NRCS FOTG 656- Constructed Wetlands). It is permissible under this general permit to construct artificial wetlands pursuant to NRCS FOTG 656 so long as natural wetland conversion is not occurring and all other applicable eligibility criteria are being met.	
The purpose of the project may not be to fill wetlands for a transportation project to construct, reconstruct or maintain a road, bridge, arch or culvert.	
The project may not result in permanent placing or discharging fill onto more than 10,000 square feet (0.23 acre) of wetland as part of a single and complete project.	
The project may not result in temporary placing or discharging fill onto more than 2 acres of wetland as part of a single and complete project.	
The project activities will not take place in or directly or indirectly result in the <u>conversion</u> of sedge meadows, forested wetlands, or rare wetland community types, such as calcareous fens and those listed in s. 281.36(3g)(d) , Wis. Admin. Code, into other wetland types or non-wetlands. Project activities will not take place in undisturbed wetland plant communities <u>dominated</u> by non-invasive native hydrophytes.	
Project sites that have existing <u>wetlands</u> on or adjacent to the project which meet one of the following criteria are allowed: <ul style="list-style-type: none"> a. Wetland Community A: A degraded wetland plant community <u>dominated</u> by agricultural crops, early successional hydrophytes, invasive plants (native or non-native) or non-native plants. To determine which species are considered invasive, go to DNR’s website at http://dnr.wi.gov/ and search “invasive plants.” b. Wetland Community B: A wetland plant community <u>dominated</u> by a mix of invasive, early successional, non-native, and non-invasive native plants that exhibits site alterations, such as ditching or tiling, that have impacted hydrology. 	
The proposed project cannot avoid wetland impacts and has minimized wetland impacts to the greatest extent practicable.	
The project will be constructed in a manner that will maintain wetland hydrology in the remaining wetlands.	

Table 3. Water Control Structure Criteria.

<p>Wetland Eligibility Criteria: Projects that install a water control structure on a watercourse and do not meet all criteria are not eligible for this general permit. If your project does not qualify for this general permit, you may apply for an individual permit.</p>	
<p>The water control structure is only placed on a non-navigable watercourse, not a navigable stream or river.</p>	
<p>The water control structure meets the definition of a small dam and has a <u>structural height</u> of less than or equal to 6 feet <u>or</u> a <u>structural height</u> of less than 25 feet provided that the <u>maximum storage capacity</u> is less than 50 acre-feet. Please reference “Large Dam vs. Small Dam Diagram” for the criteria of a small dam versus a large dam available at http://dnr.wi.gov/topic/Wetlands/documents/Dam_Diagram_WRGP02011_WI.pdf.</p>	
<p>A water control structure or sediment basin may only be placed by the landowner on streambed owned by the landowner.</p>	
<p>A water control structure or sediment basin may not impound water on a permanent basis and may only be placed to reduce downstream flood damage, stabilize grade, reduce erosion, or trap sediment. The water control structure will not be used for irrigation pursuant to s. 30.18, Wis. Stats., or recreational purposes.</p>	
<p>A water control structure or sediment basin must comply with Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practices 410 - Grade Stabilization Structure, 638 - Water and Sediment Control Basin, 402- Dam, or 350 - Sediment Basin and approved by an individual with with Natural Resources Conservation Service Engineering Job Approval Authority (EJAA) or Department of Agriculture, Trade and Consumer Protection Conservation Engineering Practitioner Certification (DATCP certification).</p>	
<p>The project will not flood or impede drainage of the adjacent properties or upstream properties unless recorded easements have been obtained from affected landowners.</p>	
<p>The project will not occur in a mapped floodplain (official Federal Emergency Management Agency (FEMA) or local zoning map), or if the project does occur within a mapped floodplain the project will meet the local government’s floodplain zoning standards and obtain applicable local floodplain development permit.</p>	
<p>Water control structures and any accompanying monitoring devices must be secured and prevented from moving.</p>	
<p>Water control structures must be placed in a manner that prevents the collection, removal, or dispersal of sediment away from natural surface waters to the maximum extent practicable. Temporary sediment control measures used to accomplish this should be completely removed from the waterbody after the structure installation activity is completed and the site is stabilized.</p>	
<p>Any repair, modifications or alterations of dams beyond normal maintenance will require plan review by the Department.</p>	

Table 4. Dredging Criteria.

<p>Wetland Eligibility Criteria: Projects that require dredging and do not meet all criteria are not eligible for this general permit. If your project does not qualify for this general permit, you may apply for an individual permit.</p>	
The dredging may not be located on a lake or impoundment.	
A connected enlargement may only be attached to an intermittent, navigable stream. Permitting is NOT required for connected enlargements to non-navigable waterways.	
The amount of streambed material dredged may not exceed 25 cubic yards over the course of this general permit unless additional material must be removed to repair or re-establish the project because of a catastrophic event or unless a waiver is granted by the WDNR Water Management Specialist (WMS).	
Note: Material excavated to provide a suitable foundation to place a water control structure or ford should not be factored in when calculating the amount of bottom sediment that is being removed from the navigable waterway.	
Projects involving the removal of material where a sediment cap, cover, installed barrier or other engineering controls have been installed as part of a federal or state environmental remediation to manage contaminated sediment are not eligible for this general permit. Examples of environmental remediation programs are the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), the Resource Conservation and Recovery Act (RCRA), Great Lakes Legacy Act, and a Spill Response under ch. 292, Wis. Stats., ch. NR 700, Wis. Admin. Code, or both.	
For sediment cap or cover information see SWIMS database at http://dnr.wi.gov/topic/surfacewater/swims/ .	
Any material removed from the waterbody or adjacent area may be temporarily stockpiled in an upland area outside a mapped floodplain provided it is separated from the stream by an installed silt fence or a protective, vegetated buffer strip not less than 20 feet wide.	
Any material removed from the waterbody or adjacent area may not be permanently placed in a wetland or floodplain or re-deposited below the ordinary high water mark of a navigable waterway unless it is included in the project design and submitted and approved by the Department and/or local zoning entity unless the deposit is exempt under federal, state, or local law.	
No portion of any removed material shall be permanently piled up more than 2 feet deep or have a slope exceeding a slope of 2 to 1.	
Beaver dams may be removed for the purposes of installing and maintaining the water quality improvement project.	
Dredging, including dewatering activities, shall be conducted to minimize objectionable deposits and re-suspension of sediment as described in s. NR 102.04(1)(a) and (c), Wis. Admin. Code, of sediment to the maximum extent practicable.	
Native aquatic vegetation may be removed incidental to the dredging event under this general permit without needing an additional aquatic plant management permit as required by ch. NR 109, Wis. Admin. Code.	

Table 5. Grading Criteria.

Wetland Eligibility Criteria:	
Projects that require dredging and do not meet all criteria are not eligible for this general permit. If your project does not qualify for this general permit, you may apply for an individual permit.	
Vegetation shall be established as soon as possible in conformance with Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practices Critical Area Planting (342) and monitored for at least one year after completing the project. During the monitoring period, the grading site shall be inspected regularly, and any areas requiring additional stabilization or re-vegetation shall be addressed to ensure final stabilization. Non-invasive cool season species such as Timothy (<i>Muhlenbergia glomerata</i> , <i>Muhlenbergia racemose</i>), Alfalfa (<i>Medicago x varia</i>), Alsike Clover (<i>Trifolium hybridum</i>), Smooth Brome Grass (<i>Bromus erectus</i> , <i>Bromus racemosus</i>), and Redtop (<i>Agrostis gigantea</i>) may be used to rapidly stabilize critical sites adjacent to agricultural fields. For other situations, the vegetation plan shall include species native to the area of Wisconsin where the project is located, such as Virginia Wild-Rye (<i>Elymus virginicus</i>) or Smooth Brome Grass (<i>Bromus inermis</i>).	
A site-specific erosion control plan shall be implemented in accordance with s. NR 216.46, Wis. Admin. Code, and NRCS Wisconsin Construction Specification – 5, Construction Site Pollution Control.	
Any placement of material is limited to the amount needed to ensure bank continuity upstream and downstream.	
Unless part of a permanent storm water management system, all temporary erosion and sediment control practices shall be removed upon final site stabilization. All areas disturbed during removal of temporary erosion and sediment control practices will be restored.	

Table 6. Ford Criteria.

<p>Wetland Eligibility Criteria: Projects that require a temporary or permanent ford crossing that would not meet all criteria are not eligible for this general permit. If your project does not qualify for this general permit, you may apply for an individual permit.</p>	
<p>A ford shall be designed and constructed following Criteria in Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practices 578, Stream Crossing and shall be maintained in good condition at all times.</p>	
<p>A ford will consist of a 6 to 12 inch thick layer crushed stone (2 to 6 inch D50 diameter) over a base of graded rock with a total thickness not exceeding 30 inches or pre-cast reinforced concrete planks. Geotextile may also be included for stability under the graded rock.</p>	
<p>A ford's top surface shall be placed at the same elevation as the natural streambed immediately upstream and downstream from the ford. The placement of the ford may not create an impoundment or dam upstream or a waterfall or riffle area downstream. No hoof contact material may be placed below the OHWM.</p>	
<p>The ford crossing will be no more than 30 feet wide.</p>	
<p>A ford may only be placed in a stream less than 100 feet wide and less than 2 feet deep. A ford may be placed in a wider or deeper stream if the WDNR Water Management Specialist (WMS) has approved in writing an alternative crossing location.</p>	
<p>The approach road to the ford may not have bank slopes steeper than 5-foot horizontal to one-foot vertical (5H:1V) towards the stream; Side slopes must be constructed to facilitate drainage away from the road surface and to minimize runoff flowing directly into the navigable waterway.</p>	
<p>Construction of the ford may not occur during periods of high stream flow or high water conditions where the flow is not confined to the immediate stream channel.</p>	
<p>The project will not occur in a mapped floodplain (official Federal Emergency Management Agency (FEMA) or local zoning map), or if the project does occur within a mapped floodplain the project will meet the local government's floodplain zoning standards and obtain applicable local floodplain development permit.</p>	
<p>If livestock are present, the ford (including the landing and approach) should be placed outside of a shady riparian area or include gates to discourage livestock from lingering in the stream. Cross-stream fencing at fords must be installed that includes breakaway wire, swinging floodgates, hanging electrified chain, or other devices to allow the passage of floodwater and large woody material during high flows. When stream fencing is installed, design and construct the fencing in accordance with NRCS Conservation Practice Standard, Fence, Code 382.</p>	

General Permit Dam Checklist

For new dams, embankments or other water retention structures across a watercourse. If project involves multiple dam structures, please provide the following information for each structure.

Dam structure:

1. Elevation (design elevation) of top of embankment (low point in embankment crest)
2. Elevation of the natural ground (low point) at the downstream toe of the embankment
3. Drainage area (square miles)
4. Planned pool elevation
5. Elevation of watercourse bottom at toe
6. Planned pool surface area (acres)
7. Maximum pool surface area (acres)
8. Planned storage (from bottom of impoundment to design elevation)
9. Structural height (difference between design elevation and elevation of watercourse at downstream toe) (feet)
10. Design storm frequency/duration (if calculated for standard) (year) (hour)
11. Design total discharge (if calculated for standard) (reservoir routing may reduce peak spillway outflow) (cfs)

Outlet/Spillway:

1. Outlet structure type, location, elevations, dimensions, joint treatment, corrosion protection
2. Principal spillway type, location, elevations, dimensions, materials
3. Auxiliary spillway type, location, elevations, dimensions, materials
4. Auxiliary spillway construction in natural undisturbed soils or show stability/erosion analysis
5. Drawdown facilities
6. Trash rack
7. Access for gate operation
8. Anti-vortex device

Example drawing:

